



Source: U.S. Army Reserve photo

A Study of the Economic Impacts of Military Spending and Operations in Missouri

August 2020
Jefferson City, Missouri

Prepared for
Missouri Military Advocate



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August 3, 2020

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Re: Study of the Economic Impacts of Military Spending and Operations in Missouri

Dear Mr. Driskill,

KBS and Development Strategies are pleased to submit this study of the economic impacts of military spending and operations in the state of Missouri. Direct spending by the Department of Defense and Department of Energy on contractors and to support military and non-military installation operations has a considerable impact on the state economy, generating billions of dollars of economic output and supporting thousands of jobs. This study represents an update to previous impact studies and reflects spending activity in fiscal year 2018. The methodologies and assumptions in this report build upon those established in these studies that quantified spending and economic impacts in fiscal years 2015 and 2016.

The present study aims to capture spending activity by all direct military and military support activities in the state, which include those of 1) major military installations (Fort Leonard Wood, Whiteman AFB, and Missouri National Guard), 2) other military operations (Navy, Marines, Coast Guard and Reserves), 3) national security assets (Kansas City Plant and National Security Campus), 4) non-military defense operations (including NGA and Army Corps of Engineers), 5) retiree and school support spending, 6) non-Missouri installations that impact the state (Scott AFB and Fort Leavenworth), and 7) Department of Defense contractors.

In total, all of these entities had an aggregate direct impact of \$18.2 billion in the state that generated a total direct and indirect economic output of \$29.2 billion (representing more than nine percent of Gross State Product) and supporting more than 180,000 direct and indirect jobs (representing more than six percent of total state employment).

Respectfully submitted and approved on behalf of

DEVELOPMENT STRATEGIES

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EXECUTIVE SUMMARY

The Department of Defense and other military-support operations are significant contributors to Missouri's economy. In FY2018, direct military and support spending totaled \$18.2 billion, which triggered a total direct and indirect output of \$29.2 billion and supported more than 180,000 direct and indirect jobs, representing more than six percent of total statewide employment.

PURPOSE OF STUDY

The Missouri Department of Economic Development, through the Office of the Missouri Military Advocate, commissioned Kit Bond Strategies and Development Strategies to conduct the fourth economic impact study of military spending in Missouri in June 2019. The very first assessment, released in 2013, was also a collaborative effort between Kit Bond Strategies and Development Strategies that, in addition to assessing the Department of Defense economic impact, also conducted a strengths, weaknesses, opportunities, and threats (SWOT) analysis. The second and third studies were performed by the University of Missouri and focused on fiscal years 2015 and 2016 respectively. The following study focuses on spending in fiscal year 2018, although in some instances, an annual average from fiscal years 2016 through 2018 was utilized (such as contractor spending).

CONTEXT OF MILITARY SPENDING

This report provides an overview of all military spending, followed by details for each of the entities that are represented. Total FY 2018 military spending of \$18.2 billion supports more than 180,000 direct and indirect jobs and has a \$29.2 billion in total direct and indirect economic impact. Spending and the economic impact is significantly higher compared to the FY16 report (total direct impact of \$16.2 billion). Sources of data and other important references are noted throughout.

The overwhelming percentage of Department of Defense spending in Missouri continues to be in the defense aerospace industry (nearly two-thirds of total military-related spending in the state). This industry in Missouri has experienced a recent renaissance subsequent to the last two studies, due to securing two new critical contracts and overall increases in defense spending with the start of the Trump administration in 2017.

The largest contractor has been Boeing Defense and Security located in St. Louis, whose primary role has been to build military aircraft; most recently the F-15 fighter, F/A-18 Super Hornet fighter and Growler electronic attack variant. Starting in FY15, the contracts for those aircraft were scheduled to wind down with no immediate foreign military sales opportunities and uncertain plans for U.S. Department of Defense purchases. Considering the impact that such a downturn would have had on the St. Louis regional economy, the St. Louis Economic Development Partnership and the Department of Defense Office of Economic Adjustment commissioned

and conducted three studies to determine the economic impact this change would have and the best path forward in light of those findings. Generally, the studies determined that the economic impact would be large, affecting more than 50,000 jobs and billions in revenues. The studies recommended investment in innovation and diversification of the manufacturing industry to offset the changes and take away dependence on aerospace as a single market. Fortunately, implementation of many if not all of these recommendations will not be needed for the foreseeable future.



Since the last economic update, Boeing competed for, and won with a clean-sheet design, the contract to build the U.S. Air Force's future training aircraft, the now designated T-7A Redhawk. This program represents a generational win and not only will shore up the production base in St. Louis, but it will also add jobs in the region. During this period, Boeing also won St. Louis production contracts for F-15 deliveries to Qatar and secured a multiyear contract with the US Navy for F/A-18 SuperHornet production that will extend the line well into the mid-2020s timeframe. The most significant reversal in the St. Louis production base's eventual decline was the renewed life that was breathed into the F-15 production line with the (U.S. Air Force's) Trump administration's request for eight new F-15EX aircraft. These aircraft are to be the first eight of an expected total acquisition of approximately 80 jets or more, subject to a congressionally-required Air Force analysis. Considering the last U.S. Air Force F-15 purchase was in 1999 and plans were to phase out the F-15 with F-22s and F-35s, this is a significant win for Boeing St. Louis and the Missouri-supplier base. These purchases will renew the interest of additional foreign military customers, as well as help the Air Force address near and middle term fighter aircraft shortfalls and multiple years of deferred existing fighter maintenance and delayed modernization. Additionally, the Boeing St. Charles site is expanding with a \$60 million construction project to support increased production.

In addition to the positive turn-around in the military aerospace sector, the State of Missouri and City of St. Louis were successful in retaining the future home of the Next National Geospatial Intelligence Agency West (N2W) facility. N2W will continue to provide geospatial intelligence to our military and intelligence agencies, but from a new high-tech facility from its new home in North St. Louis. The new, transformative \$1.75 billion facility will not be operational until 2024, and ground was not broken on the construction of the facility until November 2019. However, with the commencement of the facility's construction and the continued development of the geospatial ecosystem surrounding N2W, the economic impact of N2W will grow rapidly above the levels measured in this analysis. Regional and statewide efforts are underway to develop K-12 and university partnerships to support the workforce needs of the future and attract additional geospatial and technology industries to the St. Louis region. The current NGA facility and the development of N2W has already begun to make the St.

Louis region and the State attractive to related industries. The N2W project has also spawned an effort to make St. Louis the global epicenter for geospatial technology, as evidenced in one example with the successful capture of two GEOINT conventions, the industry's largest annual gathering, in 2023 and 2025. Moving forward, the indirect economic impacts of the N2W will be hugely significant given the exponential growth of the geospatial sector and unity of effort between industry, government, academia and the NGA.

MILITARY OPERATIONS

The Department of Energy supports the National Security Campus in Kansas City, Missouri which is managed and operated by Honeywell Federal Manufacturing and Technologies (FM&T). That facility is responsible for manufacturing or procuring non-nuclear components for nuclear weapons.

The Department of Defense operates several major and minor installations throughout the State, which support operations for the nation's military branches. They also fund several supporting agencies that are an important part of the military infrastructure and military capability. This spending includes payroll to military and civilian personnel, operational expenditures at installations, contracted goods and services to support installation operations, construction and other capital improvements to support programming and maintenance on facilities across Missouri. In addition, the Department of Defense also pays pensions to retired military personnel living in Missouri, which is additional household income in the State.

Department of Defense spending in Missouri represents the Department of the Air Force, Department of the Army, the Department of the Navy (including U.S. Marine Corps), National Guard, Coast Guard, and several agencies of the Office of the Secretary of Defense that support those Departments. All of those departments and agencies impact the Missouri economy through their operations at the major installations such as Whiteman Air Force Base and Fort Leonard Wood, but also have significant impacts from operations at smaller installations and locations around the State. In addition to these installations directly hiring employees, they also contract with various vendor businesses across the State to provide goods and services to those operations, which in turn hire their own staff and contribute to the State's economy.

SUMMARY OF IMPACTS

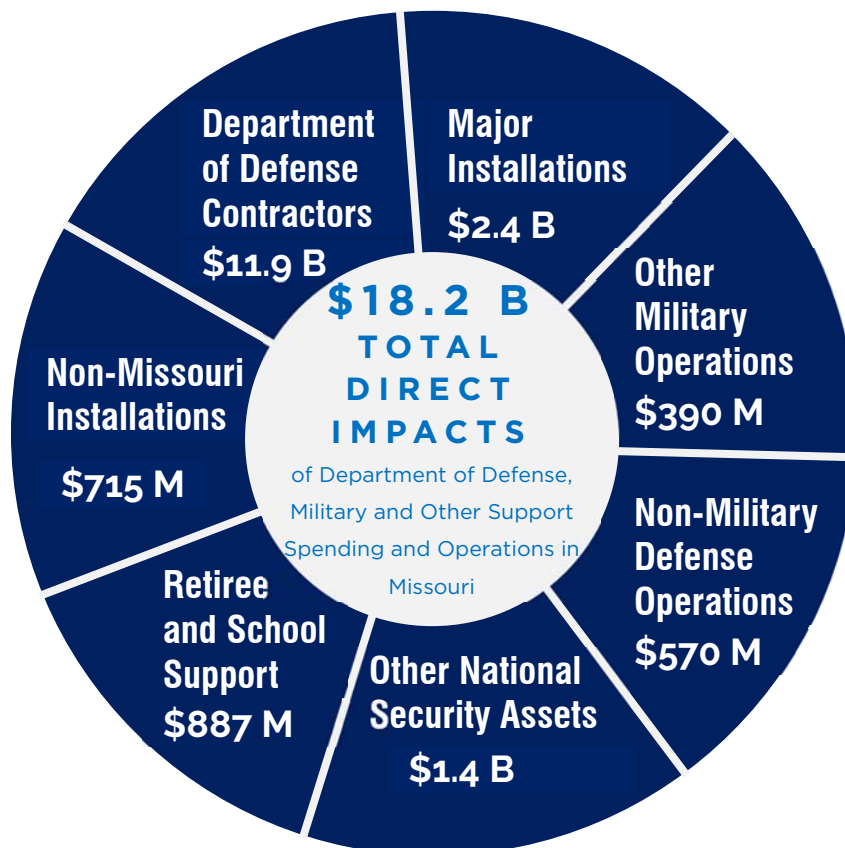
Military spending in Missouri primarily comes from two federal agencies, the Department of Defense (DoD) and the Department of Energy (DoE), although supplemental support spending comes from the Department of Education and from visitors to the state. The DoE supports the Kansas City National Security Campus operated by FM&T, while DoD funds all the other military facilities and assets across the State, as well as various support agencies for the military. In addition, DoD contracts with Missouri-based companies for various products and services. DoE does the same, but most of the funding is used to support the National Security Campus in Kansas City. Both agencies' military spending impact Missouri's economy and both are included in this analysis.

In FY 2018, Missouri captured \$17.0 billion of DoD spending and \$1.1 billion in DoE spending, in addition to spending from the Department of Education (Impact Aid) and visitors, resulting in a total direct and indirect economic impact of almost \$30 billion. Putting that in perspective, Missouri's total Gross State Product (GSP) was just under \$319 billion; therefore, military-related spending represented more than nine percent of the State's GSP.

Economic output considers the value of all inputs in the production process, so it is a more robust measure of economic activity compared to GSP. See Appendix for further explanation.

Nearly two-thirds of DoD spending (\$11.9 billion) was in the form of contract awards for Missouri-based vendors. Those contracts were to produce goods and provide services to support not only DoD operations within Missouri, but also nationally and internationally. Major installations of Fort Leonard Wood, Whiteman Air Force Base, and the Missouri National Guard also contributed approximately \$2.4 billion in total spending. The remaining spending in the state came from reserves and other military branches, non-military operations, Missouri-based retirees, Impact Aid, visitors, and "border state operations," including Fort Leavenworth (Kansas) and Scott Air Force Base (Illinois).

Total direct military spending of \$18.2 billion in FY18 resulted in \$29.2 billion in total direct and indirect economic output supporting more than 180,000 jobs across the State. In other words, for every \$1.00 of military spending invested in Missouri, the economic impact was over \$1.60 in goods and services purchased in the State.



Annual Direct Expenditures in Missouri

\$18.2 B

Total FY2018
Expenditures



Total Annual Direct and Indirect Economic Impacts to Missouri

\$29.2 B in economic output

\$11.0 B in earnings to residents

180,068 jobs supported

Economic Impacts of Defense and Other Support Operations in Missouri, FY2018

	Total Direct Spending	Direct and Indirect Impacts		
		Economic Output	Labor Income	Jobs Supported
Dept. of Defense Contractors	\$ 11,858,409,000	\$ 18,285,780,000	\$ 5,544,390,000	\$ 74,002
Major Installations	\$ 2,392,672,000	\$ 4,219,120,000	\$ 2,562,899,000	45,906
Whiteman AFB ¹	423,640,000	743,189,000	462,661,000	8,553
Fort Leonard Wood ²	1,220,937,000	2,111,844,000	1,226,256,000	20,493
Missouri National Guard	748,095,000	1,364,087,000	873,982,000	16,860
Other National Security Assets	\$ 1,435,557,000	\$ 2,422,919,000	\$ 708,396,000	13,459
Kansas City Plant	301,000,000	474,058,000	116,301,000	3,755
National Security Campus	1,134,557,000	1,948,861,000	592,095,000	9,704
Retiree and School Support	\$ 886,746,000	\$ 1,049,617,000	\$ 349,836,000	7,918
Retiree Payments	860,424,000	1,001,879,000	323,485,000	7,336
Impact Aid	26,322,000	47,738,000	26,351,000	582
Non-Missouri Installations	\$ 714,574,000	\$ 1,462,371,000	\$ 770,839,000	17,214
Scott Air Force Base	704,254,000	1,444,198,000	758,178,000	13,459
Fort Leavenworth	10,320,000	18,173,000	12,661,000	3,755
Non-Military Defense Operations	\$ 569,690,000	\$ 1,036,755,000	\$ 587,428,000	8,671
DCAA	12,570,000	27,857,000	16,028,000	188
USMEPCOM	10,820,000	17,936,000	9,485,000	67
DCMA	36,534,000	61,208,000	33,094,000	567
NGA	387,323,000	785,401,000	438,418,000	6,660
Army Corps of Engineers (KC District)	103,682,000	109,749,000	76,331,000	916
Army Corps of Engineers (STL District)	18,761,000	34,604,000	14,072,000	274
Other Military Operations	\$ 390,218,000	\$ 738,072,000	\$ 454,176,000	12,897
Army Reserves	164,445,000	328,322,000	169,079,000	7,168
Navy Active Duty and Reserves	45,294,000	82,315,000	57,349,000	1,685
Marine Corps Active Duty and Reserves	154,315,000	280,442,000	195,384,000	3,568
Coast Guard	26,164,000	46,993,000	32,364,000	476
\$ 18,247,866,000	\$ 29,214,634,000	\$ 10,977,964,000	180,068	

¹ Excludes National Guard and Reserve units to avoid double counting of total impacts; includes visitor spending impacts

² Includes visitor spending impacts



IMPACTS OF MAJOR MILITARY INSTALLATIONS

Missouri's three major installations/operations, Whiteman Air Force Base, Fort Leonard Wood, and Missouri National Guard, spent nearly \$2.4 billion in FY2018 to pay their 30,000 military, civilian, and reserve personnel, support operations, and construct and maintain facilities in the state.

ECONOMIC IMPACTS OF WHITEMAN AIRFORCE BASE

Overview

Whiteman Air Force Base (Whiteman AFB) is located in Johnson County, Missouri just south of the city of Knob Noster about 70 miles southeast of Kansas City. It is a joint-service base that includes Air Force, Missouri Air and Army National Guard and Air Force Reserve units.

The base is the home of the U.S. Air Force's 509th Bomb Wing (509 BW) and Missouri Air National Guard Associate unit, the 131st Bomb Wing (131 BW). These two units represent the world's only B-2 bomber units. The 509th Maintenance Group and the 509th Operations Group are responsible for the flying mission at Whiteman. Other support units include the 509th Mission Support and Medical groups and the 442nd Air Force Reserve Fighter Wing operating the venerable A-10. Additional tenant units at Whiteman include: Training Support Squadron, Det. 12, 72nd Test and Evaluation Squadron, 325th Weapons Squadron, and the Air Force Office of Special Investigations Det. 12. An additional Air Force mission of vital importance and lethality is the 20th Attack Squadron. The 20th Attack Squadron currently flies the General Atomics MQ-9 Reaper remote-piloted aircraft (RPA), however, it does so as one of six U.S.-based units that are geographically separated from its Wing headquarters in Nevada. Despite not being co-located with the majority of the combat squadrons, like most units, the 20th executes an invaluable mission at Whiteman delivering air power for the U.S. anywhere it is needed on the globe.

The Missouri Army National Guard's 1-135th Assault Battalion operating UH-60 Blackhawk helicopters is also stationed at Whiteman. This unit transitioned from Apache Longbow Attack Helicopters and was identified in 2019 to transition from its current UH-60 LIMA models, to the newest UH-60 MIKE model aircraft. The men and women of the 1-135th provide a critical, dual-use capability for both the President in time of war and the Missouri Governor in times of domestic or state emergencies.

Subsequent to the last economic impact study, Whiteman AFB was selected as one of three Global Strike Command installations from which to operate the Air Force's new B-2 replacement, the B-21 Raider. Successful local, state and congressional advocacy efforts in part coordinated and executed by the Office of Missouri Military Advocate helped result in this successful win. This decision will ensure Whiteman Air Force Base's long-term future is secure as a projection point for delivering U.S. air power

and serve as an anchor mission for retaining and attracting future missions. As the U.S. Air Force continues development, production and testing of the B-21, the B-2 will remain the preeminent platform for U.S. Air Force nuclear and conventional strike.



Source: Whiteman Air Force Base



Source: Whiteman Air Force Base Facebook page



Source: Senior Airman Bryan Crane, Whiteman Air Force Base

Economic Impacts

Including all military and civilian personnel, Whiteman AFB had over 7,400 direct jobs and nearly \$445 million in direct spending in the state of Missouri in FY2018, which triggered a total direct and indirect economic output of \$782.7 million, supporting nearly 10,200 jobs in the state. In addition, out-of-state visitors to Whiteman's Wings Over Whiteman airshow in FY18 spent an estimated \$2.0 million in the state resulting in more than 36 extra jobs and nearly \$3.0 million total impact. In addition, the Knob Noster School District (school district serving Whiteman AFB families) received \$5.2 million in Impact Aid, which resulted in a total economic impact of \$9.4 million and supported over 115 jobs in the state.

Whiteman Airforce Base, Annual Expenditures, FY2018

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
7,406	\$357,080,000	\$76,585,000	\$11,185,000	\$444,850,000

Source: Whiteman AFB

Economic Impacts of Whiteman Airforce Base Operations on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$444,850,000	\$782,735,000	1.76	\$491,002,000	10,190

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Economic Impacts of Whiteman Airforce Base Visitor Spending on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$1,870,000	\$2,538,311	1.36	\$928,640	30

IMPLAN

Economic Impacts of Whiteman AFB Impact Aid on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$5,203,000	\$9,436,000	1.81	\$5,209,000	115

IMPLAN

ECONOMIC IMPACTS OF FORT LEONARD WOOD

Overview

Fort Leonard Wood (FLW) is located in Pulaski County, Missouri, 92 miles northeast of Springfield and 138 miles southwest of St. Louis. FLW is a joint-service base that includes Air Force, Army, and Navy units. In 2019, FLW celebrated its 20th anniversary as the Army's home of the Maneuver Support Center of Excellence, training over 80,000 military personnel and civilians annually, which includes training in basic combat, engineering, chemical/biological, radiological/nuclear, military police, brigade special troops battalions, maneuver enhancement brigades, counter-improvised explosives device, and protection. As a major training facility, trainees come from all over the country, and as mentioned, all branches of service and has the capacity to train additional non-DoD federal agencies in first-response and homeland defense-oriented missions. FLW trains the largest concentration of U.S. Marines outside any of its U.S. Marine Corp installations and continues to consider additional training opportunities at FLW to support their mission.

Similar to Whiteman AFB and given its rural location, the vast majority of military and civilian personnel live on the base (active duty military) or in the nearby communities of Waynesville and St. Robert or elsewhere in Pulaski County. Trainees live on the base anywhere from two weeks to one year, but the vast majority have home addresses outside of Missouri.

Since the last study and in addition to projects like the new fire house and airport improvements, a major military construction project was authorized and approved for funding: the replacement of the General Leonard Wood Army Community Hospital (GLWACH). The estimated project cost is \$250 to \$500 million, with an anticipated construction duration of four years, representing the Army's long-term commitment to sustaining and enhancing operations at FLW. The new GLWACH will be 256,397 gross square feet (GSF) and includes in-patient health services and ancillary support spaces to include nutrition, imaging, pharmacy, laboratory and radiology. Continued efforts to ensure adequate staffing and annual appropriations will be needed to ensure this state-of-the-art facility will be completed by 2022.

FLW represents Missouri's largest active duty, National Guard or Reserve military installation. It is by far the single-largest economic driver in the Central-Southern Missouri region. The overall increases in military spending

and specifically, increases in overall Army end-strength since the beginning of the Trump administration in 2017, have been beneficial to the installation. The installation's resilience to multiple years of budget sequestration and two Army-proposed Programmatic Environmental Assessment (PEA) force structure reductions, including the significant loss of the Forces Command Maneuver Enhancement Brigade, are a testament to the paramount training missions and installation assets inherent at FLW. Since the last study, FLW as an installation has been able to shift from that of a defensive posture and protecting its missions, to positioning itself offensively for incremental growth and attracting new missions. FLW will be able to attract new missions by continuing to leverage its lack of encroachment and world-class training areas, concentration and synergy of training missions and unmatched community, state and federal support.



Economic Impacts

In FY2018, FLW had 12,100 direct jobs, including 8,200 military personnel and 3,900 civilians. Though FLW trains approximately 80,000 individuals annually, there is an estimated 11,100 trainees on-post at any given time representing an annual FTE. Since trainees come from all over the country, not all of their payroll has an impact on Missouri (trainees will spend the majority of their wages in their home states). Based on survey information from the Leonard Wood Institute, it is assumed that 30 percent of trainee payroll is captured in Missouri (residents and portion of spending off-post during training). Therefore, it is assumed that in FY2018, FLW had a total payroll impact of \$810.9 million. In addition to wages, in FY2018, FLW spent \$280.1 million to support non-labor operations and \$108.0 million for major construction.

The \$1.2 billion in direct spending resulted in a total direct and indirect output of nearly \$2.1 billion, of which, nearly \$1.2 billion was labor income supporting more than 20,160 direct and indirect jobs in the state.

In addition to the nearly \$1.2 billion in direct spending, FLW attracted over 150,000 visitors who spent an estimated \$22.0 million in Missouri that could be attributed to their trip. Also, the Waynesville R-6 School District received just under \$20 million in Impact Aid.

In the FY 2018 Defense Authorization and Appropriations bills, an initial \$100 million down payment was approved for the replacement of the General Leonard Wood Army Community Hospital (GLWACH).

The total project cost for replacement has been estimated at over \$400 million total and represents the second largest military construction project in the state of Missouri currently underway. While these initial funds were approved during this study's scope, the contract award for the design and construction was not awarded until calendar year 2019 and the ground will not have been broken until Summer of 2020. Subsequent economic impact studies that can access FY2019, FY2020 and beyond will reflect an even greater economic impact from what is already Missouri's largest and most expansive military installation.

Fort Leonard Wood, Annual Expenditures, FY2018

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
12,100	\$810,863,150	\$280,069,300	\$108,000,000	\$1,198,932,450

Source: Fort Leonard Wood

Economic Impacts of Fort Leonard Wood Operations on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$1,198,932,450	\$2,081,723,215	1.74	\$1,215,516,445	20,161

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Economic Impacts of Fort Leonard Wood Visitor Spending on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$22,005,000	\$30,121,000	1.37	\$10,740,000	332

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Economic Impacts of Fort Leonard Wood Impact Aid on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$19,903,000	\$36,096,000	1.81	\$19,924,000	440

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ECONOMIC IMPACTS OF MISSOURI NATIONAL GUARD

Overview

Unlike Whiteman AFB and Fort Leonard Wood, the Missouri National Guard is spread out all over the State, and as such, so too is the economic benefit.

The Missouri National Guard includes the Missouri Army National Guard and Missouri Air National Guard and operates installations and stations personnel throughout the State. The Missouri National Guard headquarters is located at the Ike Skelton Training Site in Jefferson City, Missouri. The largest proportion of personnel is stationed at the headquarters in Jefferson City, but there is also a major presence at Whiteman AFB, Jefferson Barracks in St. Louis, Rosecrans in St. Joseph, and the Army National Guard in Springfield.

With personnel scattered across the State, the National Guard's economic impact is distributed throughout the State; therefore, the primary impacts are from its personnel living in the State. Since the Missouri National Guard is part of the United States National Guard and Missouri Department of Public Safety, not all of its funding is through the Department of Defense; it receives an insignificant amount of its funding through the state of Missouri, but the specific breakdown of state and federal funds is unavailable. Therefore, for the purposes of conducting the economic impact analysis, its entire annual spending was considered.

Thanks to forward-leaning leadership, positive recruitment and strong full-time manning, growth in the Missouri National Guard remained steady even as the Obama administration defense and force structure reductions were taking place across the services.



Since October 2017 alone, the Missouri National Guard added a significant amount of force structure and new units resulting in a total of 557 new personnel. Engineering, Transportation, Military Police, Medical, and Cyber units were all added to the Missouri Army National Guard. Some of this new force structure included the 1142nd Engineering Company in West Plains; the 1251st Transportation Company in Harrisonville and Nevada; and the 205th Medical Company and 179th Cyber Protection Team Detachment at Jefferson Barracks. These force structure additions account for a significant increase in the Missouri National Guard's economic impact since the last study and represent one of the most significant increases in the DoD's economic impact in Missouri.

In total, the Missouri National Guard spent nearly \$748.1 million to support operations, of which, \$620.9 million was payroll to support around 11,500 direct employees. The remaining \$127.2 million was spent to support non-labor operations and capital expenditures. The \$748.1 million in total direct spending triggered nearly \$1.5 billion in total direct and indirect output, of which \$872.1 million was labor income that supported 16,860 direct and indirect jobs in the state.

Missouri National Guard, Annual Expenditures, FY2018

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
11,499	\$620,935,000	\$120,031,000	\$7,129,000	\$748,095,000

Source: Missouri National Guard

Economic Impacts of National Guard Operations on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$748,095,000	\$1,364,087,000	1.82	\$873,982,000	16,860

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Aviation Classification Repair Activity Depot (AVCRAD)

The Missouri AVCRAD provides depot repair for rotary wing aircraft, supporting 14 states across the central United States. The AVCRAD is one of four AVCRAD facilities in the United States in Connecticut, Mississippi, California and Missouri performing two combat service support (CSS) functions: maintenance and supply. It is responsible for limited depot aircraft maintenance, component repair, operation of a supply support activity, and aviation intermediate maintenance (AVIM). These maintenance and supply activities cannot be performed by the designated units it serves either due to an excessive amount of work requests, lack of personnel with the required training and expertise, or lack of the proper tools and equipment.

In addition to being a major job provider, the AVCRAD shop's activities annually provide over \$100 million in government cost savings as well as tens of millions in annual economic impact to the Springfield area. The Missouri National Guard AVCRAD facility, and hence its economic impact, is also growing. Congress appropriated \$32 million for Phase 3A MILCON which was awarded just after this study was completed. Phase 3A consists of an 84000 ft² two-story facility with administration, local shop, avionics shop and other related operational support spaces along with new parking. Upon completion, phase 3A will substantially increase annual cost savings yielded by the AVCRAD, with construction payback costs in less than 2 years according to the Missouri National Guard. In FY 21, funds will be pursued for Phase 3B.

AVCRAD Operations in Missouri, Annual Expenditures, FY2018

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
532	\$28,727,000	N/A	N/A	\$28,727,000

Source: Missouri National Guard; AVCRAD

Economic Impacts of AVCRAD on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$28,727,000	\$52,382,000	1.82	\$36,432,000	705

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139th Airlift Wing, Rosecrans Air National Guard Base

The 139th Airlift Wing has been at Rosecrans Air National Guard Base, St Joseph, Missouri since 1947 and represents the Missouri National Guard's largest base operation in Missouri. The 139th Airlift Wing is a Mobility Air Force unit that operates the C-130H tactical airlifter used for both domestic and wartime missions. In addition to the C-130H operations, the 139th is also home to unique and advanced training missions that increase the number of assigned personnel and overall economic impact of the 139th beyond that of a traditional flying unit. The Advanced Airlift Tactics Training Center (AATTC), known as the "Top Gun" for military airlift is located at the 139th AW. The AATTC trains airlift aircrews to increase the warfighting effectiveness and survivability of mobility forces. The AATTC is in its third decade of providing training to the Air National Guard, Air Force Reserve Command, Air Mobility Command, Air Combat Command, Air Force Special Operations Command, United States Marine Corps, and 18 allied nations.

In addition to the AATTC which provides advanced training for multiple airlift platforms, the 139th is also home to the Air Force's C-130H Weapons Instructor Course (WIC). The WIC provides training specifically for the C-130 Hercules aircrews with the most sought-after tactics and leadership development to ensure every C-130H unit has an expert instructor and mentor.

In 2015, the detachment of the 29th Weapons Squadron began teaching the first class of C-130H students at Rosecrans after a successful effort to secure the new mission. Investments in base infrastructure modernization and military construction continued to be executed as part of the 139th's master plan to relocate further north from its current location on the southern end of Rosecrans Airport. Investments in facilities like the recent communications and simulator facilities, along with planned future hangar and aircraft apron investments, will continue to enhance the already significant economic impact that the 139th has on the St. Joseph community and surrounding region.

As a subset of the impacts of aggregate Missouri National Guard operations, the operation of the Rosecrans Air National Guard Base, home of the 139th Airlift Wing, included \$117.1 million in overall spending, of which, \$62.1 million were labor costs to support its 1,100 staff.

Through its spending of \$117.1 million to support operations, this triggered \$197.6 million in total direct and indirect economic output, of which, \$104.3 million was household earnings that supported more than 1,900 jobs in the state.

St. Joseph Rosecrans National Guard 139th Airlift Wing, Annual Expenditures, FY2018

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
1,100	\$62,086,000	\$42,644,000	\$12,340,000	\$117,070,000

Source: 139th Airlift Wing

Economic Impacts of St. Joseph Rosecrans NG 139th Airlift Wing on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$117,070,000	\$197,600,000	1.69	\$104,324,000	1,904

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Jefferson Barracks

Jefferson Barracks in St. Louis, MO is the largest, joint, multi-component military installation in Eastern Missouri. As the oldest continually operating U.S. military installation west of the Mississippi, Jefferson Barracks' role in the nation's defense has continued to evolve over its almost 200 years of existence. And as the installation executes its core missions in the areas of Command & Control, Cyber, Intelligence, Communications and Civil Engineering, its future contributions to the nation's defense are as bright and important as its rich past. Jefferson Barracks units provide critical combat support capabilities to missions all over the globe, from those within the vast expanse of the Pacific Command, to those within the endless reach of Global Strike Command. The installation also possesses a number of unique communication and information technology capabilities that few other installations can provide to the Department of Defense. These capabilities position the installation to take on more missions in the future and to further expand its economic impact in the St. Louis and Eastern Missouri region. Jefferson Barracks' close proximity to neighboring Department of Defense Missions at the National Geospatial Intelligence Agency and Scott Air Force Base, yields beneficial mission and personnel synergies as well. And Jefferson Barracks' location within the St. Louis Metropolitan "beltway" creates a solid recruitment base from some of the nation's largest corporations, best universities and most patriotic communities.



Jefferson Barracks Operations in Missouri, Annual Expenditures, FY2018

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
810	N/A	N/A	N/A	\$53,780,000

Source: Missouri National Guard

Economic Impacts of Jefferson Barracks Operations on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$53,780,000	\$86,519,000	1.61	\$45,211,485	1,048

Source: IMPLAN



ECONOMIC IMPACTS OF OTHER MILITARY OPERATIONS

Other military operations based in Missouri include Army, Navy, Marine Corps Reserves and Active Duty and Coast Guard, which had a combined estimated total FY2018 expenditures of \$390.2 million with more than 10,500 personnel.

IMPACTS OF OTHER MILITARY OPERATIONS IN MISSOURI

Other military operations in the state include the Army Reserves, U.S. Marine Corps Active Duty and Reserves, and Navy Active Duty and Reserves, and Coast Guard which operate throughout the state. The impacts of the Air Force Reserves are included in the overall impacts of Whiteman AFB, but the isolated impacts are shown on the following pages.

In total, these combined operations had a total estimated payroll of \$318.9 million with more than 10,500 personnel and total direct spending of \$364.1 million. Their operations resulted in a total direct and indirect impact of \$738.1 million supporting nearly 12,900 jobs.

Total Other Active Duty and Reserves Operations in Missouri, Annual Expenditures, FY2018

Direct Personnel	Payroll	Operational	Capital	Total Direct
10,533	318,880,000	45,897,000	N/A	\$390,218,000

Source: Defense Manpower Data Center; Development Strategies

Economic Impacts of Other Active Duty and Reserves Operations on Missouri, FY 2018

Total Direct Annual	Total Economic	Output	Total Labor	Total Jobs
\$390,218,000	\$738,072,000	1.89	\$454,176,000	12,897

Source: Defense Manpower Data Center; Development Strategies; IMPLAN

ARMY RESERVES

The U.S. Army Reserve comprises nearly twenty percent of the Army's organized units, half of its total maneuver support and sustainment capabilities and a quarter of its mobilization base-expansion capacity. The Army Reserve has more than 200,000 Soldiers and civilian employees and 2000 units spread across 20 time zones. The U.S. Army Reserve footprint within Missouri is significant, with 5,930 soldiers, 21 facilities, 103 Units/Detachments and 233 civilian personnel.

Its largest unit consists of the 102nd Training Division. The 102nd provides mission-critical combat ready soldiers in the engineer, chemical and military police military occupational specialties (MOS) from Fort Leonard Wood.

In 2014, the Weldon Spring Army Reserve Center in St. Charles County was established. This center includes maintenance, classroom, office and storage spaces as well as a rifle range, obstacle course and wilderness area for training exercises. The Army Reserves Missouri footprint also consists of soldiers assigned to the Army Reserve Medical Command's 7215th Medical Support Unit from St. Louis and the 24th Medical Detachment. These units also use the Weldon Spring Area for training.

In FY2018, the Missouri Army Reserves spent \$164.4 million to support operations, which generated total direct and indirect economic output of \$328.3 million, of which, \$169.1 million was labor income that supported 7,168 direct and indirect jobs in the state.

Army Reserves in Missouri, Annual Expenditures, FY2018

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
6,163	\$119,271,000	\$45,174,000	N/A	\$164,445,000

Source: U.S. Army Reserves

Economic Impacts of Army Reserves Operations on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$164,445,000	\$328,322,000	2.00	\$169,079,000	7,168

Source: IMPLAN

NAVY ACTIVE DUTY AND RESERVES

Despite Missouri's land-locked geography, it is home to three Navy Reserve Operational Support Centers located in St. Louis, Kansas City and Springfield. At Fort Leonard Wood, The Center for Seabees and Facilities Engineering Detachment (CSFE DET) provides a wide range of training to Sailors and Seabees in support of both afloat and ashore Navy missions. Equipment operator and engineering aide apprentice training is conducted in Fort Leonard Wood's joint environment. This training prepares Seabees to provide support to naval forces in the form of contingency construction, disaster recovery and humanitarian assistance. Also co-located with the CSFE DET, the Center for Naval Engineering Learning Site offers a course aimed at protecting naval vessels from chemical, biological and radiological defense attacks. Naval aviation's strong ties to the State through Boeing's assembly of the F/A-18 SuperHornet also maintain a strong connection to the United States Navy and Missouri's vast suppliers as well.

Navy Active Duty and Reserves in Missouri, Annual Expenditures, FY2018

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
1,412	\$45,294,000	N/A	N/A	\$45,294,000

Source: Defense Manpower Data Center; Assistant Secretary Navy Office, Development Strategies

Economic Impacts of Navy Active Duty and Reserves Operations on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$45,294,000	\$82,315,000	1.82	\$57,349,000	1,685

Source: Defense Manpower Data Center; Assistant Secretary Navy Office, Development Strategies; IMPLAN

MARINE CORPS ACTIVE DUTY AND RESERVES

Missouri has some of the strongest linkages to United States Marine Corps outside of the Corps' primary concentration of base operations in the Carolinas and California and Japan.

The Marine Corps Detachment (MARCORDET) at Fort Leonard Wood began with an exclusive focus on engineer training in 1974 and has rapidly expanded since 1995 to include Marine Corps training for engineer equipment operators (1995), motor transport operators (1996), military police (1999) and CBRND specialists (1999). The MARCORDET now operates as one of the largest military occupational specialty schools in the Marine Corps, with one of every seven new Marines joining the Corps passing through this command. With a permanent core of 300 Marines and an annual student load of nearly 7,000, MARCORDET, FLW, serves proudly as the Corps' largest standing detachment.¹

In addition to the Marine Corps' substantial training operations at FLW, Kansas City, MO is the home of the Corps' Mobilization Command. This Command executes functions associated with all units in the Marine Corps Reserve, which represents the largest command in the Corps. Kansas City also is home to the Marine Corps' Human Resources and Organizational Management Headquarters for all of the Corps's civilian personnel.

Marine Corps Active Duty and Reserves in Missouri, Annual Expenditures, FY2018

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
2,637	\$154,315,000	N/A	N/A	\$154,315,000

Source: Defense Manpower Data Center; Assistant Secretary Navy Office, Development Strategies

Economic Impacts of Marine Corps Active Duty and Reserves Operations on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$154,315,000	\$280,442,000	1.82	\$195,384,000	3,568

Source: Defense Manpower Data Center; Assistant Secretary Navy Office, Development Strategies; IMPLAN

¹ https://www.mybaseguide.com/army/64-3593-21822/fort_leonard_wood_marine_corps_detachment

AIR FORCE RESERVES (442ND FIGHTER WING)

The Air Force Reserve's largest Missouri footprint is comprised of the 442 Fighter Wing at Whiteman Air Force Base. The 442nd operates the venerable A-10 Thunderbolt close-air support fighter and is one of only four Air Force Reserve Fighter Wings in the country. With increased counter-terrorism operations post September 11, 2001, the 442nd has experienced multiple deployments to multiple theaters of operation given its unique and unmatched capability to execute the close air support mission.

Continued investments in the A-10's sustainment and modernization have been made by Air Force and congressional leaders over the course of this period. These investments are planned to sustain operation of the A-10s at the 442nd into the early 2030s or until a replacement platform such as an F-35 is assigned to the unit. The 442nd is also afforded tremendous access to training ranges near Fort Leonard Wood and throughout the surrounding region that are uniquely suited for the A-10's air-to-ground mission. In addition, the 442nd benefits from combined training synergies that can be found training with other Whiteman Air Force Base tenant units.

The economic impacts of the Air Force Reserves are included in the impacts of Whiteman AFB, although the following analysis highlights their isolated impacts. In FY2018, there were 1,218 Air Force Reserves (military) and 259 442nd Fighter Wing civilian personnel at Whiteman AFB for a total of 1,477 personnel. Total labor costs were \$37.9 million. The non-labor operational and capital expenditures could not be isolated for Reserve operations, so the following analysis only considers the impacts of the labor expenditures.

Air Force Reserves (442nd Fighter Wing) in Missouri, Annual Expenditures, FY2018

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
1,477	\$37,900,103	N/A	N/A	\$37,900,103

Source: Whiteman AFB

Economic Impacts of Air Force Reserves Operations on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$37,900,103	\$31,206,845	0.82	\$48,064,588	1,706

IMPLAN

COAST GUARD

The Coast Guard is the principal Federal agency responsible for maritime safety, security, and environmental stewardship in U.S. ports and waterways. In this capacity, the Coast Guard protects and defends more than 100,000 miles of U.S. coastline and inland waterways, and safeguards an Exclusive Economic Zone (EEZ) encompassing 4.5 million square miles stretching from North of the Arctic Circle to South of the equator, from Puerto Rico to Guam, encompassing nine time zones—the largest EEZ in the world. As one of the five Armed Services of the United States, the Coast Guard is the only military branch within the Department of Homeland Security. In addition to its role as an Armed Service, the Coast Guard is a first responder and humanitarian service that provides aid to people in distress or impacted by natural and man-made disasters whether at sea or ashore. The Coast Guard is a member of the Intelligence Community, and is a law enforcement and regulatory agency with broad legal authorities associated with maritime transportation, hazardous materials shipping, bridge administration, oil spill response, pilotage, and vessel construction and operation.

The Missouri Sector is the parent command to three Marine Safety Detachments, five River Buoy Tenders, and a boat forces unit with 5 response boats. Together, the Sector and its subordinate units directly support the Coast Guard's five main mission areas; including maritime security, maritime safety, protection of natural resources, maritime mobility, and national defense across a geographically expansive area of responsibility encompassing the Upper Mississippi, Illinois, and Missouri Rivers and their navigable tributaries.

The estimated total direct spending of \$26.2 million in FY2018 triggered \$48.2 million in direct and indirect output, of which, \$32.9 million was labor income that supported nearly 500 direct and indirect jobs in the state.

Coast Guard in Missouri, Annual Expenditures, FY2018

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
321	\$25,441,000	\$723,000	N/A	\$26,164,000

Source: Defense Manpower Data Center; Coast Guard; Development Strategies

Economic Impacts of Coast Guard Operations on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$26,164,000	\$46,993,000	1.80	\$32,364,000	476

Source: Defense Manpower Data Center; Coast Guard; Development Strategies; IMPLAN



ECONOMIC IMPACTS OF NON- MILITARY DEFENSE OPERATIONS

The Department of Defense supports a number of non-military operations in Missouri which include DCAA, USMEPCOM, DCMA, and NGA. In total, these operations generated more than \$1 billion in total direct and indirect economic output and supported nearly 8,700 jobs in the state.

IMPACTS OF DEFENSE CONTRACT AUDIT AGENCY (DCAA)

The Defense Contract Audit Agency (DCAA) provides audit and financial advisory services to Department of Defense (DoD) and other federal entities responsible for acquisition and contract administration. DCAA operates under the authority, direction, and control of the Under Secretary of Defense (Comptroller)/Chief Financial Officer.

The DCAA operates more than 300 field offices throughout the United States and internationally. The Missouri field office is located in St. Louis with an estimated payroll of \$12.6 million (extrapolated based on previous reporting). Total headcount was not provided, so total jobs supported was derived from IMPLAN.

Defense Contract Audit Agency (DCAA) Annual Expenditures, FY2018

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
N/A	\$12,569,838	N/A	N/A	\$12,569,838

Source: DCMA; Defense Manpower Data Center; Development Strategies

Economic Impacts of Defense Contract Audit Agency (DCAA) on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$12,569,838	\$27,856,721	2.22	\$16,028,470	188

Source: DCAA; Defense Manpower Data Center; Development Strategies; IMPLAN

IMPACTS OF UNITED STATES MILITARY ENTRANCE PROCESSING COMMAND (USMEPCOM)

The St. Louis and Kansas City MEPS are two locations in a network of 65 military entrance processing stations (MEPS) located nationwide and in Puerto Rico. A separate Department of Defense (DoD) agency, USMEPCOM is comprised of two geographical sectors and staffed with personnel from all military services.

The mission of USMEPCOM and the St. Louis and Kansas City MEPS are to process individuals for enlistment or induction into the armed services, based on DoD-approved peacetime and mobilization standards. FY2018 expenditure data extrapolated based on previous reporting.

U.S. Military Entrance Processing Command (USMEPCOM) Annual Expenditures, FY2018

Command Location	Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
St. Louis	N/A	\$3,179,000	\$2,236,000	N/A	\$5,415,000
Kansas City	N/A	\$2,793,000	\$2,612,000	N/A	\$5,405,000

Source: St. Louis MEP; Kansas City MEP; Defense Manpower Data Center; Development Strategies

Economic Impacts of USMEPCOM - St Louis Office on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$5,415,000	\$9,046,000	1.67	\$4,913,000	33

Source: St. Louis MEP; Defense Manpower Data Center; Development Strategies; IMPLAN

Economic Impacts of USMEPCOM - Kansas City Office on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$5,405,000	\$8,890,000	1.64	\$4,572,000	33

Source: Kansas City MEP; Defense Manpower Data Center; Development Strategies; IMPLAN

IMPACTS OF DEFENSE CONTRACT MANAGEMENT AGENCY (DCMA)

The Agency provides contract administration services for the Department of Defense, other federal organizations and international partners, and is an essential part of the acquisition process from pre-award to sustainment.

DCMA has approximately 12,000 employees worldwide, mostly civilians, at offices and contractor facilities like those located in Hazelwood, Missouri. The location of DCMA in Hazelwood is a direct result of sharing proximity with Boeing, Missouri's and one of the Department of Defense's single largest contractors. According to DCMA, every business day it receives nearly 1,000 new contracts and authorizes more than \$650 million in payments to contractors.

After contracts are awarded, DCMA monitors contractors' performance and management systems to ensure that cost, product performance, and delivery schedules are in compliance with the terms and conditions of the contracts. DCMA had an estimated total FY2018 expenditures of \$36.5 million (extrapolated based on previous reports). IMPLAN was used to derive estimated payroll and employment.

Defense Contract Management Agency (DCMA) Annual Expenditures, FY2018

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
N/A	N/A	N/A	N/A	\$36,534,000

Source: DCMA; Defense Manpower Data Center; Development Strategies

Economic Impacts of Defense Contract Management Agency (DCMA) on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$36,534,000	\$61,208,000	1.68	\$33,094,000	567

Source: DCMA; Defense Manpower Data Center; Development Strategies; IMPLAN

IMPACTS OF NATIONAL GEOSPATIAL AGENCY (NGA)

The National Geospatial-Intelligence Agency (NGA) delivers all the geospatial intelligence (GEOINT) to policymakers, warfighters, intelligence professionals and first responders. Anyone who sails a U.S. ship, flies a U.S. aircraft, makes national policy decisions, fights wars, locates targets, responds to natural disasters, or even navigates with a cellphone relies on NGA. NGA enables all of these critical actions and shapes decisions that impact our world through the discipline of GEOINT. NGA is a combination of an intelligence and combat-support agency serving both the Department of Defense (DOD) and the intelligence community.

NGA is the lead federal agency for GEOINT and manages a global consortium of more than 400 commercial and government relationships. The director of NGA serves as the functional manager for GEOINT, the head of the National System for Geospatial Intelligence (NSG) and the coordinator of the global Allied System for Geospatial Intelligence (ASG). In its multiple roles, NGA receives guidance and oversight from DOD, the Director of National Intelligence (DNI) and Congress. While NGA is headquartered in Springfield, VA, its other two major locations are in St. Louis and Arnold, MO. The St. Louis facility, known as NGA West, essentially mirrors the missions and functions executed at the Springfield headquarters, but with approximately 1/3 of the footprint and personnel.

In 2015, the NGA began compiling locations for consideration and assessment to relocate out of its long-standing and historic St. Louis location on Second Street. This project, known as the Next National Geospatial Intelligence Agency West (N2W) project, was due to the status of the current NGA West facilities no longer being adequate to support NGA's expanding and technologically-advancing mission. In early 2015, the Missouri Military Preparedness and Enhancement Commission's team of defense consultants at Kit Bond Strategies, helped to initiate and coordinate a massive effort led by the City of St. Louis and regional stakeholders to retain the NGA in Missouri. These efforts were successful, despite attractive offers from Scott Air Force Base community stakeholders, and NGA first announced its intention to select the site in North St. Louis on April 1, 2016.

Subsequent to that announcement, efforts continued to support the development of the future site, turn the site over to the Department of Defense and commence construction on the facility when ground was officially broken in November 2019. Construction on the 97-acre site will include a more than 700,000-square-foot office building, parking garages, a visitor center and security checkpoints. During peak construction in 2022, the U.S. Army Corps of Engineers anticipates the project will employ more than 1,100 workers a day. The U.S. Army Corps's Kansas City District is overseeing the construction and design work of McCarthy HITT, a combined venture between Missouri-based McCarthy Building companies and HITT Contracting. The construction contract is estimated at \$700 million and the full economic impact of this \$1.7 billion project is just in its infancy. As shovels started moving and construction contract awards were made in calendar year 2019, the substantive, positive economic impact that N2W will have will be captured in subsequent studies. In addition to the construction of the facility itself, the N2W project is already serving as a key catalyst for indirect economic growth and expansion of a burgeoning geospatial ecosystem in the St. Louis region. According to the St. Louis Development Corporation, the geospatial industry currently supports more than 26,000 jobs across the St. Louis region. With exponential growth worldwide projected for the geospatial industry, the St. Louis region and the State of Missouri are committing the workforce development and infrastructure resources needed to position itself as the hub for the geospatial industry.

As the NGA currently proceeds with its major N2W expansion in North St. Louis City, it could not provide detailed operational expenditure data. However, it indicated that the new facility would include 3,700 direct employees with an average wage of \$75,000 for a total estimated payroll of \$277,500,000. The IMPLAN model was used to provide estimated impacts based on the most relevant sectors for NGA operations

NGA, Estimated Average Annual Expenditures

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures*
3,700	\$277,500,000	N/A	N/A	\$387,323,000

* Estimate based on IMPLAN model

Source: NGA

Economic Impacts of NGA Operations on Missouri*

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$387,323,000	\$785,401,000	2.03	\$438,418,000	6,660

* Anticipated based on employment and wage projections after completion of North St. Louis campus IMPLAN



Aerial rendering of proposed NGA headquarters in North St. Louis City.

Source: McCarthy Building Companies and HITT Contracting

ARMY CORPS OF ENGINEERS (KANSAS CITY DISTRICT)

The Kansas City District is one of 44 districts in nine Corps of Engineers divisions which are comprised of hundreds of areas, projects and resident engineer offices worldwide. Its operation provides engineering, management and technical support to the Department of Defense, other federal agencies, and state and local governments.

The Kansas City District was established in 1907. Its missions include Civil Works, Military Construction and the cleanup of Hazardous, Toxic and Radiation waste. Its Civil Works boundaries take in parts of Missouri, Kansas, Iowa, Nebraska, and Colorado. Its Military Construction boundaries encompass the states of Missouri and Kansas.

In FY2018, the Kansas City District spent \$98.7 million on labor costs for its 908 positions, \$350.3 million in non-labor operational expenditures and \$14.5 million in capital expenditures. A breakdown of operational spending by state was unavailable, but it was noted that 61 percent of personnel live in Missouri, and thus, \$60.2 million of payroll could be attributed to Missouri. Given the challenges with attributing non-labor spending to Missouri, these expenditures were not included in the model, and thus, the impacts should be considered understated.

Army Corps of Engineers (Kansas City) Annual Expenditures, FY2018

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
553	\$60,189,000	N/A	N/A	\$60,189,000

Source: Army Corps of Engineers, Kansas City District

Economic Impacts of Army Corps of Engineers (Kansas City) on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$60,189,000	\$109,749,000	1.82	\$76,331,000	916

IMPLAN

ARMY CORPS OF ENGINEERS (ST. LOUIS DISTRICT)

The St. Louis District includes 28,000 square miles between Missouri and Illinois. Its mission includes flood relief, construction and maintenance of 87 levees totaling 750 miles and ensuring safe passage with the Congress-mandated nine-foot navigation channel on 300 miles of the Middle Mississippi River, 80 miles of the lower Illinois River and 36 miles of the Kaskaskia River.

Updated operational spending data was unavailable for this analysis, but based on previous reports, it was estimated that in FY2018, the St. Louis District spent \$18.8 million to support operations, which included labor costs of just under \$7.0 million to support its 82 direct staff.

Army Corps of Engineers (St. Louis) Annual Expenditures, FY2018

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
82	\$6,962,000	N/A	\$11,799,000	\$18,761,000

Source: Army Corps of Engineers

Economic Impacts of Army Corps of Engineers (St. Louis) on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$18,761,000	\$34,603,503	1.84	\$14,072,013	274

Source: Army Corps of Engineers; IMPLAN



ECONOMIC IMPACTS OF OTHER NATIONAL SECURITY ASSETS

Missouri is home to two considerable government-owned security assets: Lake City Army Ammunition Plant, which is one of the largest small arms manufacturers nationally, and the Kansas City National Security Campus, which produces non-nuclear components for national defense systems. These assets support more than 13,400 direct and indirect jobs in the state.

KANSAS CITY PLANT (KCP) / NATIONAL SECURITY CAMPUS

The Kansas City Plant (KCP) has most of its operations in Missouri, with satellite facilities in Arkansas and New Mexico. The main facility is located on 122 acres of the 300-acre Bannister Federal Complex (BFC), 12 miles south of downtown Kansas City, Missouri. The BFC is owned by the U.S. General Services Administration (GSA), which leases the KCP portion to NNSA. The facility is operated by Honeywell Federal Manufacturing & Technologies and employs approximately 4,200 workers in support of National Nuclear Security Administration (NNSA) activities.

The Kansas City Plant was built during World War II to assemble engines for Navy fighter planes. After the war, the Atomic Energy Commission contracted the Bendix Corporation to manage production of nonnuclear components for nuclear weapons at the Plant. The KCP has been the primary site for conducting that mission ever since.

In addition to making nuclear weapons parts for NNSA, the KCP makes parts for other DOE offices, DoD, other government agencies and the United Kingdom. The Plant produces or procures 85 percent of all components that make up a nuclear warhead, including firing and arming systems, radars, guidance systems, reservoirs for tritium, foams and adhesives. KCP states that it now has its busiest workload in 20 years with total contract awards increasing by more than 40 percent from FY2016 to FY2018. Much of this work is for 'Life Extension Programs' for existing nuclear weapons.

Based data from USAspending.gov, in FY2018 the Department of Energy awarded Honeywell FM&T \$1.1 billion to operate KCP with operations triggering more than \$1.9 billion in total economic output, of which \$593.1 million was labor income supporting more than 9,700 jobs in the state.

Economic Impacts of National Security Campus Operations on Missouri, FY 2018

Total Direct Annual Contract Award*	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$1,134,557,000	\$1,948,861,000	1.72	\$592,095,000	9,704

*Represents total Department of Energy contract allocation for Honeywell International's Missouri-based operations for FY2018

Source: USAspending.gov; IMPLAN

LAKE CITY ARMY AMMUNITION PLANT

Northrop Grumman Innovation Systems currently operates the Lake City Army Ammunition Plant (LCAAP) in Independence, MO as a Government-owned, Contractor-operated (GOCO) facility within the United States Army Joint Munitions Command. For more than 75 years, LCAAP has been providing small-caliber ammunition from facilities occupying the 3,935-acre site. LCAAP encompasses 408 buildings, 43 magazines, nine warehouses, 11 igloos and a storage capacity of 707,000 square feet and also serves as a national and regional test center for ammunition performance and weapons firing.

In 2019, three prime contracts were awarded to provide the Army's planned new Next Generation Squad Weapon, chambered in 6.8mm. The new NextGen 6.8mm munitions will be produced primarily at LCAAP. In addition, in 2019 the Army awarded Olin Winchester (a subsidiary of Clayton, Missouri-based Olin Corporation) the contract to run LCAAP after Northrop Grumman's current contract expires at the end of Fiscal Year 2020. According to Olin Winchester, the initial contract is valued at \$28,313,48 and if all of the options are exercised, could run the plant until Sept. 27, 2029.

LCAAP's facilities are part of an aging Army Organic Industrial Base complex that has been in need of modernization and new facilities for many years. Concerted and coordinated efforts led by the Missouri Congressional delegation have resulted in annual increases to the Army industrial facilities modernization accounts that have been directed to modernize LCAAP.



According to the Joint Munitions Command, LCAAP is currently engaged in modernization and munition reform projects valued at more than \$254 million. LCAAP's modernization projects include a multi-use load facility, a demilitarization facility and state-of-the-art X-ray and ultrasonic mixing technology facility, among others. Many of these substantive modernization initiatives have sustained and grown the positive economic impact of LCAAP as one of Missouri's major DoD operations.

According to a Northrop Grumman representative, in FY2018, the company was awarded \$301 million in government contracts and had a total headcount of approximately 1,900 employees.

Economic Impacts of Lake City Army Ammunition Plant Operations on Missouri, FY 2018*

Total Direct Annual Contract Award*	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$301,000,000	\$474,058,000	1.57	\$116,301,000	3,755

*Impacts reflect direct government contract awards as reported by Northrop Grumman, not aggregate operations, which includes a significant private sector commercial component

Source: Northrop Grumman; IMPLAN



ECONOMIC IMPACTS OF RETIREE AND SCHOOL SUPPORT SPENDING

Other forms of direct military impacts in Missouri come in the form of retirement payments to Missouri residents (\$860 million) and Impact Aid from the Department of Education (\$26 million) to support school districts in areas with a large military presence, primarily Knob Noster School District (Whiteman AFB) and Waynesville School District (FLW).

ECONOMIC IMPACTS OF MILITARY RETIREE SPENDING

Missouri attracts a sizeable number of military retirees who receive direct payments from the Department of Defense. According to the Department of Defense Office of the Actuary, in FY2018, there were just over 39,000 retirees with Missouri mailing addresses receiving monthly retirement payments. These payments totaled an estimated \$860.4 million for FY2018, which essentially represents additional direct household income for state residents.

This figure may understate the impact of retiree spending since it does not consider spending by retirees living in bordering states or those with secondary residences in Missouri. At the same time, it is assumed that there is a “no net effect” since many retirees living in Missouri may spend money in neighboring states (although the IMPLAN model assumes this leakage).

According to IMPLAN, the \$860.4 million paid to retirees with permanent addresses in Missouri, resulted in a total economic output of just over \$1.0 billion, of which \$323.5 million was labor income supporting just over 7,330 jobs in the state, as presented in the following table.

Economic Impacts of Military Retirees Living in Missouri, FY2018			
Total Direct Retiree Payments	Total Economic Output	Total Labor Income	Total Jobs Supported
\$860,424,000	\$1,001,879,000	\$323,485,000	7,336

Source: Department of Defense Office of the Actuary; IMPLAN

ECONOMIC IMPACTS OF IMPACT AID TO SCHOOLS IN MISSOURI

The U.S. Department of Education’s Impact Aid program is, in part, designed to supplement funding for school districts in areas with large shares of federally-owned tax-exempt lands, which includes major DoD installations. In FY 2018, Missouri received just over \$26.3 million in Impact Aid to school districts impacted by DoD operations, most of which went to Waynesville R-6 School District, near Ft. Leonard Wood, and Knob Noster R-8 School District, near Whiteman AFB.

The \$26.3 million in funding spending resulted in over \$47.7 million in economic output, of which, \$26.4 million was labor income supporting more than 580 jobs throughout the state.

Impact Aid Awarded to Missouri School Districts, FY2018	
Waynesville R-6 School District	\$ 19,903,000
Knob Noster R-8 School District	5,203,000
Rest of State	1,217,000
Total Impact Aid	\$ 26,323,000

Source: USAspending.gov

Economic Impacts of Impact Aid on Missouri, FY 2018				
Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$26,322,000	\$47,738,000	1.81	\$26,351,000	582

Source: USAspending.gov; IMPLAN



ECONOMIC IMPACTS OF NON- MISSOURI INSTALLATIONS

Missouri is home to hundreds of personnel stationed at Scott Air Force Base (Illinois) and Fort Leavenworth (Kansas) as well as contractors, and thus, these non-Missouri installations have an impact on the Missouri state economy. In FY2018, These installations had an estimated direct impact of \$715.4 million on the Missouri economy.

SCOTT AIR FORCE BASE

Scott Air Force Base, located in Illinois about 27 miles southwest of Downtown St. Louis, had an estimated total direct impact on Missouri of \$704.3 million (extrapolated from previous reports), which resulted in a total direct and indirect output of \$1.44 billion, of which \$758.2 million was labor income supporting more than 10,650 jobs.

Scott AFB Annual Expenditures (with Impacts on Missouri), FY2018

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
5,710	\$517,572,000	\$87,271,000	\$99,411,000	\$704,254,000

Source: Scott AFB

Economic Impacts of Scott AFB on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$704,254,000	\$1,444,198,000	2.05	\$758,178,000	10,652

Source: Scott AFB; IMPLAN

FORT LEAVENWORTH

Updated expenditure data was unavailable for this analysis, but based on previous reports, it was estimated that Fort Leavenworth's impacts on Missouri included an estimated \$10.0 million in direct payroll (extrapolated from previous reports), which resulted in a total direct and indirect impact of \$18.2 million supporting 535 total jobs in the state.

Fort Leavenworth Expenditures (with Impacts on Missouri), FY2018

Direct Personnel	Payroll	Operational Expenditures	Capital Expenditures	Total Direct Expenditures
475	\$10,000,000	\$0	\$0	\$10,000,000

Source: Ft. Leavenworth; Development Strategies

Economic Impacts of Fort Leavenworth on Missouri, FY 2018

Total Direct Annual Spending	Total Economic Output	Output Multiplier	Total Labor Income	Total Jobs Supported
\$10,000,000	\$18,173,000	1.82	\$12,661,000	535

IMPLAN



ECONOMIC IMPACTS OF DEPARTMENT OF DEFENSE CONTRACTORS

In FY2018, the Department of Defense awarded just under \$15.0 billion in contracts to more than 800 different Missouri-based vendors. Contract awards in this fiscal year were higher than in FY2017 (\$9.7 billion) and FY2016 (\$10.9 billion).

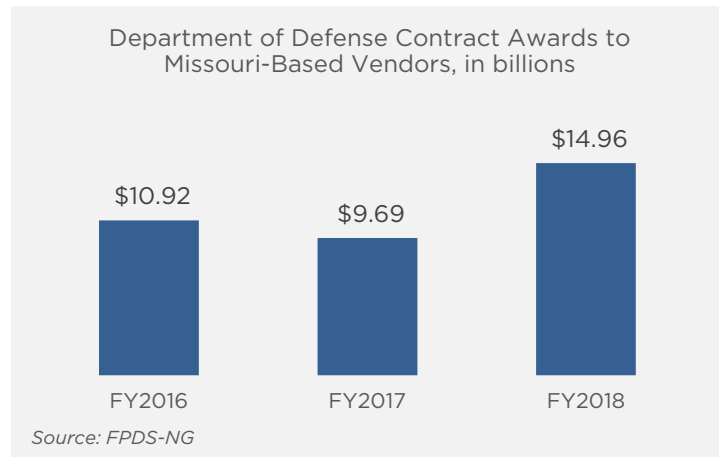
DEFENSE CONTRACT OVERVIEW

Department of Defense contract awards represent the largest share of military spending in the state of Missouri. In FY2018, Missouri-based vendors received just under \$15.0 billion in contract awards, up from \$9.7 billion in FY2017 and \$10.9 billion in FY2016 to support operations in the state, nationally, and internationally. Procured goods and services encompass a vast array of industry sectors from sophisticated aircraft and weaponry to food services and uniforms. In turn, the production of these contracted goods and services support other industries across the state creating jobs and economic prosperity. These contracts do not exclusively support Missouri-based military or non-military installations—some installations from outside of Missouri procure goods and services from Missouri-based firms to support their operations; thus, Missouri uses these “out-of-state” Department of Defense dollars to export goods and services nationally and internationally.

The data used to assess the economic impacts of these awarded contracts were obtained from the Federal Procurement Data System-Next Generation (FPDS-NG), which has provided all contract actions for Federal vendors since 1979.²

Of DoD contract awards in FY2018, ten firms captured 92 percent of these awards (\$13.8 billion total). The Boeing Company had by far the largest share of DoD contract awards with \$11.7 billion representing 78 percent of awards.

The majority of contract awards supported manufacturing sectors, including aircraft, weaponry, navigation systems, and computer manufacturing. Among the top ten sectors, manufacturing represented 78 percent of total contract awards with nearly half of all contract awards for aircraft manufacturing.



Top DoD Contract Awards by Missouri-Based Vendor, FY2018

Vendor Name	Total Contract Dollars Obligated	Percent of Total Awards
The Boeing Company	\$ 11,669,820,000	78.0%
Express Scripts	661,530,000	4.4%
World Wide Technology	399,200,000	2.7%
Clark McCarthy Healthcare Partners II	236,360,000	1.6%
Alliant Techsystems Inc.	222,200,000	1.5%
Finmeccanica S.P.A.	214,000,000	1.4%
J.E. Dunn Construction	141,570,000	0.9%
The Korte Company	84,410,000	0.6%
Burns & McDonnell	75,930,000	0.5%
Spectrum Healthcare Resources	74,360,000	0.5%
All Other Missouri-Based Vendors	1,184,310,000	7.9%
Total FY2018 Awards	\$14,963,690,000	

Source: FPDS-NG

Top DoD Contract Awards to Missouri-Based Vendors by Sector, FY2018

Detailed Sector by NAICS	Total Contract Dollars Obligated	Percent of Total Awards
Aircraft Manf. (336411)	\$ 7,413,000,000	49.5%
Ammunition (except small arms) Manf. (332993)	2,013,850,000	13.5%
Other Aircraft Parts Manf. (336413)	1,358,400,000	9.1%
Health/Medical Insurance Carriers (524114)	663,520,000	4.4%
Commercial/Inst Building Construction (236220)	641,420,000	4.3%
Navigation/Aeronautical/Nautical Instr. Manf. (334511)	367,430,000	2.5%
Small Arms Manf. (332992)	273,680,000	1.8%
Engineering Services (541330)	204,130,000	1.4%
Electronic Computer Manf. (334111)	198,730,000	1.3%
Guided Missile/Space Vehicle Manf. (336414)	168,810,000	1.1%
All other Sectors	1,660,720,000	11.1%
Total FY2018 Awards	\$14,963,690,000	

Source: FPDS-NG

² These contract actions (\$3,000 or greater) only represent actions for primary contractors and they do not include any subcontracting plan details. It is assumed that the IMPLAN modeling accounts for any subcontracting, or indirect impacts from these primary contracting awards. Conversely, not captured in this analysis are sub-contract awards to Missouri-based vendors from prime contractors located out of state.

ECONOMIC IMPACTS OF DEFENSE CONTRACTS

All contract awards were aggregated by industry sector (NAICS) and assigned the appropriate IMPLAN sector code to quantify the economic impacts that these obligations have on the state of Missouri. Note that contract awards are not completely spent in the year that they are obligated and a single contract award could take years to be completed. Additionally, contract awards from previous years could be spent in FY2018. Therefore, an average annual award of \$11.9 billion (FY2016 to FY2018) was used in the model and the economic impacts represent the total potential impacts as a snapshot in time, but could take many years to manifest themselves.



Economic Impacts of Department of Defense Contract Awards to Missouri-Based Vendors, Three-Year Average (FY2016-FY2018)

Total Direct Spending from Contract Awards	Total Economic Output	Total Labor Income	Total Jobs Supported
\$11,858,409,000	\$18,285,780,000	\$5,544,390,000	74,002

ECONOMIC IMPACTS OF DEFENSE RESEARCH AND DEVELOPMENT CONTRACTS

Research awards are an important part of the contract spending because it supports basic research, often connected to research universities and brings with it a lot of downstream benefits. One of the reasons this spending is so important to innovation and the development of new technologies is that the early phases of product development are almost never attractive to private investors. Concept development, early prototyping, and initial market development during the pre-revenue period of a new product's development is very difficult to finance without public funding. Getting new technologies to the market and to benefit the economy requires this early research and development. This type of primary and early stage research allows new and innovative technologies that would not otherwise be possible.

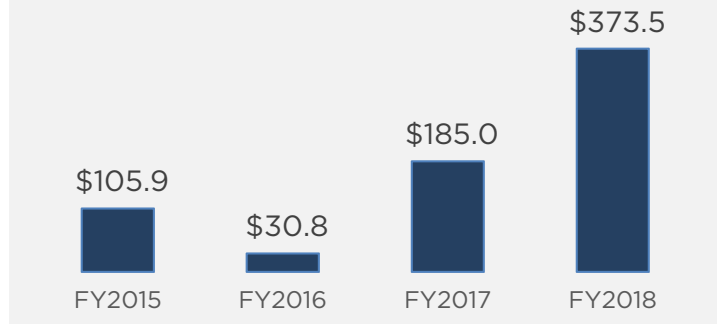
Universities and government agencies often collaborate on those projects. It provides the opportunity for faculty and students to learn while at the same time benefits the people and corporations that utilize the technology once it is commercialized. Those funds support the educational environment for Missouri's students via their connection to the universities that participate in those research contracts. Other economic benefits can include the clustering effect of companies that start or move to a place where research and development is being done for business purposes and a business community that often relies on this type of funding to produce the new technology they can't afford to invest in individually.

Companies that commercialize new technology often can't afford to invest in a new technology until it reaches a point in its development where the product is ready to scale and the customer base is known. Previous to that, in the pre-revenue and even the pre-minimum-viable-product stage, it is difficult for companies to devote resources to that stage of R&D, so many companies today don't have as much R&D capacity as large corporations once did.

There has been a considerable increase in R&D contract awards in Missouri over the last few years, increasing from \$330.8 million in FY2016 to \$373.5 million in FY2018.

Department of Defense Research and Development (R&D) Contract Awards to Missouri-Based Vendors, in millions (\$)

Source: USAspending.gov



Top DoD R&D Contact Awards by Missouri-Based Vendor, FY2018

Vendor Name	Total Contract Dollars Obligated	Percent of Total R&D Awards
The Boeing Company	309,294,533	82.8%
MRIGlobal	24,172,744	6.5%
Sabreliner Aviation	12,353,128	3.3%
University of Missouri System	8,282,274	2.2%
OM Group	2,770,589	0.7%
Thermavant Technologies	2,204,472	0.6%
Asynchrony Solutions Inc.	2,119,561	0.6%
Finmeccanica SPA	1,997,471	0.5%
Lickenbrock Technologies	1,658,412	0.4%
Donald Danforth Plant Science Center	1,552,992	0.4%
All Other Missouri-Based Vendors	7,083,598	2.3%
Total FY2018 Awards	\$ 373,489,775	

Source: FDPS-NG

METHODOLOGY, ASSUMPTIONS AND LIMITATIONS

IMPLAN MODELING

Economic impacts represent the spending and subsequent re-spending of a company, organization, industry sector, or other economic entity to support its operations. As a particular economic entity spends money to pay its staff, build facilities, or hire contractors, this spending generates more economic activity and supports additional jobs in a particular geographic study area. This “cycle” of spending can be quantifiable using a number of analytical resources. The economic impacts presented in this report were derived using IMPLAN, which is a proprietary software that utilizes classic input-output analysis with regional social accounting matrices (SAMs). The economic impact modeling can be customized based on types of expenditures and linked to 536 distinct industry sectors. Key terminology include:

- **Direct Impacts**, which represent the initial spending of an economic entity (in this case, a Missouri-based military installation or agency or contractor). To the extent possible, direct spending was broken down by labor, non-labor, and capital expenditures;
- **Indirect Impacts**, which represent business-to-business spending triggered by the direct impacts;
- **Induced Impacts**, which represent economic activity supported by household spending, or spending of payroll for housing, retail needs, transportation, etc.;
- **Labor Income**, which represents total income created from the three spending categories above;
- **Value Added**, which represents the end value of goods or service produced, similar to gross domestic product (GDP) or state product (GSP); and,
- **Output**, which is the total measure of economic activity, including value of goods and services throughout the production process, and thus, it is a more robust measure of economic activity compared to Value Added or GDP.

When using the IMPLAN modeling, Labor Income includes wages and benefits. IMPLAN provides general inflators to estimate Labor Income based on direct wages (if benefits are not included in the loaded labor cost). In the case of federal government, employee benefits (health insurance, pension, etc.) are typically not included in the reported labor expenditures; however, in some cases they are and data to inform the distribution of wages and benefits was not available for this analysis. Therefore, the labor expenditures were input as Labor Income, and thus, in some cases, the impacts of the labor expenditures are understated.

Regarding non-labor operational expenditures, these were considered “Institutional Spending Pattern-Federal Government Defense,” within the IMPLAN model. Though the operational spending patterns between installations and other defense operations vary, this classification best represents “typical” government-supported defense operations in the state.

DATA SOURCES

In order to support this analysis, data was obtained from a number of sources. There is no centralized source of data or reporting that represents the breadth of this study. The Department of Defense’s Office of Economic Adjustment provides annual state-level reporting on contract spending and defense payroll; however, this only represents appropriated fund spending and does not capture non-appropriated spending or confidential civilian operations (for example, NSA).

- **Major Military Installations:** Operational spending and personnel data was obtained directly from each of the major installations, including Fort Whiteman Air Force Base, Fort Leonard Wood, and Missouri National Guard.
- **Other Military Operations:** Actual FY2018 expenditure data for the Navy Reserves and Active Duty, Marine Corps Reserves and Active Duty, and Coast Guard was unable to be obtained for this analysis; therefore, estimates were made based on FY2016 and employment trends from the Defense Manpower Data Center (DMDC). It was assumed that changes in personnel has a proportional impact in payroll and operational spending. Operational spending data was obtained directly from a representative with the Army Reserves.
- **Non-Military Operations:** The direct impacts of DCAA, USMEPCOM, DCMA, and Army Corps of Engineers St. Louis District were extrapolated from previous reports/analyses with a straight-line inflator applied to their annual spending tally. Operational spending data was received from the Army Corps of Engineers Kansas City District with

a breakdown of Missouri residents; however, a breakdown of non-labor and capital spending was not available to isolate these impacts on the state of Missouri. The direct impacts of NGA were derived from IMPLAN based on its estimated employment 3,700 and average wage.

- **Other Security Assets:** Direct expenditure data was received from Northrop Grumman. The direct spending from government contracts were used in the IMPLAN model as reported by a company representative (\$301 million in FY2018). The total headcount of 1,900 was used for the direct employment tally, since it is assumed that “but for” the direct investment of the federal government, the commercial component of Northrop Grumman operations would not be possible, and thus, it is assumed that all 1,900 workers are directly or indirectly supported by the \$301 million of government investment. The total spending of Honeywell to operation the National Security Campus (\$1.13 billion) is based on direct contract awards from the U.S. Department of Energy from USAspending.gov.
- **Retiree and School Supporting Spending:** Impact Aid spending was obtained via USAspending.gov based on awards to the state of Missouri from the U.S. Department of Education. Retiree spending for Missouri residents was obtained from the Department of Defense Office of the Actuary, Statistical Report on the Military Retirement System.
- **Non-Missouri Installations:** Updated spending data was not obtained from Scott AFB or Fort Leavenworth, and thus, the model inputs were derived based on previous reports/analyses and a straight-line inflator was applied.
- **Department of Defense Contractors:** Contract award data was obtained from USAspending.gov and Federal Procurement Data System (FPDS) based on awards from FY2016 through FY2018. Within IMPLAN, industry sector for each awards (NAICS) was applied to the IMPLAN sector codes. In some cases, the industry sector field was blank; therefore, the total contract awards with blank sector fields were assumed to follow the same distribution as those with codes. Just over six percent of total contract awards did not have codes.

OTHER NOTES AND ASSUMPTIONS

- **Whiteman AFB:** Visitor impacts were based on attendance to the Wings Over Whiteman air show, which attracted an estimated 100,000 visitors in 2018. Based on previous visitor survey data and studies, it is assumed that 22 percent of these visitors come from out of state, of which, 50 percent are overnight visitors staying two nights. Based on reasonable estimates for per capita spending for daytrip and overnight visitors, it is assumed that out-of-state daytrip visitors spent \$440,000 [11,000 x \$40] and overnight visitors spent \$1,430,000 [\$65 per capita per day x 2 days x 11,000] in the state.
- **Fort Leonard Wood:** Total FY2018 labor costs for Fort Leonard Wood were \$1.23 billion; however, a large proportion of these expenditures include trainees (\$599.4 million), many of whom do not live in Missouri permanently and only stay in the state during training. Therefore, the model assumes that 30 percent of these labor expenditures are retained in the state based on share of time spent in the state and for those with permanent Missouri residences.
- **Retiree Impacts:** The IMPLAN model makes adjustments to the impacts of household income based on annual income level, since the model accounts for personal savings. In other orders, lower income households will more likely spend additional household income in the local economy, while higher income households will save or invest the added income. Based on IMPLAN parameters, it is assumed that the average retiree household has an annual income between \$40,000 and \$50,000, which is consistent with data from the Bureau of Labor Statistics (BLS).
- **Department of Defense Research and Development (R&D) Contracts:** Within the database of DoD contracts (via FDPS or USAspending.gov), all records with a Product or Service Code (PSC) containing “R&D” or “Special Studies/Analysis” were identified. This is assumed to be the most straightforward and replicable approach to quantifying R&D contract awards; however, it should be recognized that some R&D activity may be contained within other contract actions, and thus, our conclusions should be considered understated.

GENERAL LIMITATIONS

The primary goal of this report is to assess the direct impacts of Department of Defense spending in Missouri to operate its facilities, pay its personnel (active, inactive, civilian, and retired), and award contracts to private firms. In addition to this spending other impacts include those from visitor spending and Impact Aid allocations. The ability to calculate the quantitative impacts is dependent on the availability of reliable data. Much of the data used in this report are from publicly available federal sources, and to the extent possible, data directly provided by the major installations in the state (Whiteman AFB, Fort Leonard Wood, Missouri National Guard).

There are other impacts on the state of Missouri from Department of Defense activities that are more difficult to track and are not included in this report. This unaccounted for activity is summarized in two ways: 1) subcontracts issued to Missouri-based firms from Department of Defense prime contractors that are located outside of Missouri, and 2) Department of Defense personnel that are assigned to a location outside of Missouri but live in Missouri and are not accounted for in Ft Leavenworth and Scott AFB data. In both cases, Department of Defense dollars are indirectly entering the state and getting absorbed into the economy.

Regarding the subcontracts awarded to Missouri-based firms, it is assumed that in addition to subcontract dollars entering the state, subcontract dollars also leave the state, since prime contractors in Missouri may source goods and services from out-of-state firms. Without reliable data to track this inflow and outflow of dollars, it is assumed that this creates a net effect of zero. Therefore, only prime contractor dollars awarded to Missouri-based firms are considered.

Regarding the residence of personnel, in accordance to federal Personally Identifiable Information (PII) compliance requirements, the home locations of Department of Defense personnel is not publically available. This report relies upon anecdotal information on personnel residence from the major installations. This report does not make any estimates for the number of personnel stationed at installations outside of Missouri with the exception of Scott Air Force Base and Fort Leavenworth. These personnel are paid out-of-state, but bring their household earnings into Missouri, which, in turn, impacts the Missouri economy. At the same time, it is recognized that some workers at private firms or Department of Defense installations in Missouri may not live in Missouri. This “commuter effect” is not quantitatively assessable without reliable data; therefore, given the macro scale of the following analysis, it is assumed that there is a net effect of zero regarding Missouri-based workers living outside of Missouri and workers based outside of Missouri living in Missouri.